THE INTERDISCIPLINARY JOURNAL OF PROBLEM-BASED LEARNING

Introduction to Special Issue "Research Methodologies for Studying Problem-based and Project-based Learning

Woei Hung (University of North Dakota)

IJPBL is Published in Open Access Format through the Generous Support of the School of Education at Indiana University, the Jeannine Rainbolt College of Education at the University of Oklahoma, and the Center for Research on Learning and Technology at Indiana University.

The Interdisciplinary Journal of Problem-based Learning

2023 SPECIAL ISSUE

Introduction to Special Issue "Research Methodologies for Studying Problem-based and Project-based Learning

Woei Hung (University of North Dakota)

Problem-based and Project-based learning (PBL/PjBL) is practiced in real-world environments where individual cognitive, socio-cultural, physical, environmental, or political variables come together to form a unique educational ecosystem (Hmelo-Silver, 2004; Moallem, Hung, & Dabbagh, 2019). To evaluate the effects of PBL/PjBL on student learning, a variety of research methodologies have been utilized. They range from quantitative true experimental design that answers a simple but critical research question "Did it work?" in the early days of PBL research, to more complex methodologies such as mixed methods, or interactional ethnography that elucidate the intricate causal relationships and patterns among the variables involved in the PBL/PjBL educational ecosystem, or the nuances of the pedagogy and its implementation in terms of how it manifested itself in different disciplines, educational levels, and cultures. To depict a more detailed and complete landscape of PBL/PjBL, diverse research questions have been and will continue to be asked in more depth. Therefore, it is important that PBL researchers select and employ research methodologies that are most effective in addressing their PBL/PjBL research questions. This special issue contains eight papers representing various quantitative, qualitative, or mixed research methodologies, as well as data representations used in the context of PBL.

Furthermore, besides the aim of illustrating the PBL/PjBL research methodology landscape, this special issue also provides new PBL/PjBL researchers with an opportunity to learn about methodologies with which they may not be familiar, and how to conduct them. Hence, the format of the papers in this special issue differs slightly from a typical journal article. The first half of each paper discusses the research methodology it represents, including its origin, development, components, and process. The second half of the paper provides an illustrative example study to demonstrate how the methodology is conducted. In this special issue, Hallinger's Bibliometric Review Methodology and State of the Science Review of Research on Problem-based Learning: 2017-2022, focuses on using bibliometric review methodology in studying PBL. This paper gives a clear description of the purpose and history of the method as well as the details on its data collection, analysis, and interpretation. He demonstrates a study of using this method to analyze 5,764 Scopus-indexed documents on problem-based learning published between 2017 and 2022. Jaleniauskiene and Lisaite presents a paper, Scoping review methodology and its use to review online project-based learning in higher education, 2020-2023, on scoping review methodology. Following similar structure, Jaleniauskiene and Lisaite provide a detailed description of how to conduct a scoping review and present an example study using this method to explore project-based learning in the context of higher education over the period of 2020-2023. Walker and Leary's paper Conducting Problem-Based Learning Meta-Analysis: Complexities, Implications, and Best Practices discusses the nature of meta-analysis and the types of research questions it answers. Using examples from multiple meta-analysis studies, this paper offers guidance on the steps of conducting a meta-analysis and considerations for interpreting the results to uncover useful implications for the field of PBL/PjBL. Another popular quantitative methodology is presented by Chua, Path Analysis: The Predictive Relationships of Problem-based Learning Processes on Preservice Teachers' Learning Strategies. This paper

https://doi.org/10.14434/ijpbl.v17i2.37874

specifically focuses on Path Analysis, which is one of the widely used applications of Structural Equation Modeling (SEM). It demonstrates the research process through a study examining the predictive relationships between preservice teachers' perceptions of key PBL processes and their learning strategies before and after their PBL experiences.

Moving from quantitative to mixed and more contextualized research philosophy, Bendermacher, Egbrink, and Dolmans demonstrate the realist review method in their paper How realist reviews might be helpful to further insights in problem-based learning. In this paper, they elaborate on the theoretical foundation of the realist review approach and guide readers step-by-step through the process of conducting a realist review. Additionally, they discuss perspectives on how realist reviews can contribute to furthering insight into PBL and its future development. Also, Tweeten and Hung in their paper, Design-based Research Method in PBL/PjBL: A Case in Nursing Education, discuss another mixed and contextualized method, Design-based Research (DBR). DBR, as a research methodology, investigates the effects of a given intervention implemented in an authentic environment over iterative design-implementation-evaluation cycles. This paper uses a case in nursing education to demonstrate the DBR research process. Furthermore, qualitative research is an indispensable research paradigm that allows PBL/PjBL researchers gain deeper understanding of what happens in students' PBL/PjBL experiences and the insights as to why they happen the way they do. In An Interactional Ethnographic Exploration of In-Time and Over Time Mentor-Student Interactions in Invention Education, Skukauskaitė, Bridges, and Sullivan demonstrate an Interactional Ethnography (IE) that offers empirical and systematic ways to uncover in-time and over time complex processes and practices of inquiry-based learning. In addition to a description of the methodology and its process, they also provide an illustrative study that draws on a case in invention education (IvE) and examines expert mentors' facilitation of high school students during the process. The last paper of this special issue focuses on a variety of data visualization methods that can be used in PBL/PjBL research. In their paper, Visual Representations for Studying Collaborative Inquiry, Hong, Chakraburty, Zou, Chen, and Hmelo-Silver present various methods of visualizing student activity and collaboration during PBL sessions. These data visualization methods augment PBL researchers' understanding of the complexity within PBL classrooms by providing means for pattern recognition and behavior tracking overtime.